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Cointegration analysis and VECM of FDI, employment, export and GDP in Croatia (2002–2017) with particular reference to the global crisis and poor macroeconomic governance

JEL Classification: E20; G00; O16

Keywords: FDI; VECM model; macroeconomic variables; long-term equilibrium; crisis

Abstract

Research background: The preconditions for attracting foreign investment are political stability and long-term capital investment, positively influencing the recipient country's development. During the crisis as well as in the unstable political environment, economic agents engage in speculative and risky acts for faster earnings.

Purpose of the article: The paper aims to point out the importance of foreign direct investments (FDI) and other macroeconomic variables and their relationship with particular reference to the Croatian economy in 2002–2017.

Methods: We use ADF test, development of the VECM model, testing of the stability of the VECM model, decomposition of the variance of the predictive errors of the variables, analysis of responses to unit orthogonal pulses. The vector correction auto-regression model (VECM) explores the long-term relationship between (FDI) and macroeconomic indicators in crisis time.

Findings & Value-added: Applying the VECM model, we find that employment, export, and GDP variables are exogenous in the short term. The FDI variable is statistically significant and

adjusts for the long-run equilibrium. Analyzing the responses to unit shocks, we conclude there is weak feedback of the observed variables and a weak effect of the observed variables in the Croatian economy. The FDI variable does not affect GDP, employment, and exports in Croatia due to poor macroeconomic management, corruption, regional development, inefficiency, and inefficient foreign direct investment structure.

Introduction

The global financial crisis from 2007 to 2008, one of the deepest in the 21st century, highlighted the importance of foreign direct investment (FDI). Despite much research, how FDI affects macro and microeconomic performance is still the subject of common interests. The impact of FDI on trade, employment depends on complementarity or substitutability of foreign direct investment and exports. If the complementarity of FDI and exports prevails, then FDI will also increase exports, increasing domestic employment. That is a favorable situation for the foreign trade balance and employment. The opposite is the case for the substitution of FDI and exports, whereby employment in the export sector gives way to jobs in the economic sector to the recipient of foreign direct investment. If the substitution of FDI and imports prevails, employment may also increase, as a foreign investment firm can supply the domestic market with previously imported products. Impacts of foreign direct investment, that is, the entrances of multinational companies may, therefore, be multiple. It is up to the recipient countries to assess the potential benefits and costs. Since transition countries do not have enough capital needed to create and stimulate their technological advancement and thus economic growth, in most cases, they will rely on foreign companies to assist them in this mission (Bilas, 2006). With FDI inflows, the country has the benefits of creating jobs, transferring new technologies, know-how, enhancing the competitiveness of the domestic economy, increasing tax revenues (Paun, 2019), and having the ultimate goal of maximizing the social benefits of foreign investment.

Foreign direct investment takes place in many ways and by investment type: greenfield investments, brownfield investments, cross-border procurement, cross-border fusion, and joint ventures. Foreign direct investment stimulates economic development by creating new technologies and capital techniques in the recipient nation and through an increase in human capital. They have a significant impact on the competitiveness of the economy in the world market. Economic growth depends primarily on the tendency for GDP growth or decline. From the results obtained, solutions that can contribute to prosperity at all country levels can be predicted.

The paper points out the importance of FDI and other macroeconomic variables and their relationship with particular reference to the Croatian economy. FDI will be explored in the period 2002–2017, with specific emphasis on the crisis. Therefore, this study's results are crucial for researchers and policymakers in case of knowledge about determinants, scale, and direction of FDI. The study aims to bridge the literature gap on the long-run effects of FDI and leading macroeconomic indicators in countries with poor macroeconomic management, corruption, low competitiveness, and poor FDI structure (brownfield over greenfield FDI).

We will apply the ADF test, develop the VECM model, test the VECM model's stability, decompose the variance of the variables' predictive errors, and analyze responses to unit orthogonal shocks. We provide empirical evidence that FDI is a necessary but not sufficient condition for growth convergence. The FDI structure retains the key role in growth. Our paper is a country case study for the purpose of explaining why FDI expected positive effects disappear in some cases.

The paper has seven parts. First, it reviews previous studies on FDI. In the next section, we discuss the macroeconomic efficiency of Croatia with data and methods. Then, the results of the co-integration analysis and VECM model are presented and a dissection is given. Finally, the article concludes with summary of results and directions for future research.

Literature review

Foreign direct investments play an important role in economy growth, although its positive role isn't confirmed in all the researches. One of the more frequent arguments for the FDI is that thanks to the FDI, and thus know-how, it contributes to reduce the gap between poor and rich countries (Romer, 1993).

Dunning (1977), starts from the fact that the key elements to initiating foreign direct investment are: ownership, location and internalization (the so-called OLI paradigm) that underlie the activities of multinational companies. Desbordes and Wei (2017) studying literature, found that FDI tends to generate net gains for both home and host countries. Jovancevic (2002) indicates the largest FDI providers and recipients are EU countries, and that FDIs are significant capital investments in the world. Lovrinčević *et al.* (2004) indicate the largest share of FDI is directed to the private sector, and the smallest to the sector of public enterprises and the state and housing. Šohinger *et al.* (2006) start from the theory that FDIs are essential for the

competitiveness of the economy by applying adequate fiscal and monetary policies.

Jadhav (2012) found that in BRICS (Brazil, Russia, India, China & South Africa) economy in the period 2002–2009 traditional economic determinates are more important than institutional and political determinants of FDI (Jacimovic *et al.*, 2018). Nandi (2012), researching the same countries, found out that India is the only country among the respondents who did not regain their FDI results after the crisis.

Dornean *et al.* (2012) analyzed the relationship between the financial crisis and FDI in CEE Countries. In CEE countries, the financial crisis boomed in 2009, by reaching a decrease of FDI to 2.52% of GDP, comparatively to the level of 2008 of 6.02% of GDP. They found the financial crisis that affects directly the level of FDI. Furthermore, they confirm that economic growth has significant and positive influence on FDI.

The countries of the European Union have been examined by Hunady and Orviska (2014), who confirm, in case of FDI, the importance of labor market flexibility, firing costs, labor costs and openness of the economy. Yavas and Malladi (2020) stated that including capital market variables among the determinants of FDI is important for assessing the cost of capital and for evaluating direct investment and asset allocation decisions. They also stated too few financial factors are taken into account in the FDI analysis, what could influence decisions on these investments.

Ucal *et al.* (2010) examined the impact of the crisis on the FDI, confirming global crisis' negative impact on FDI inflows. Desbordes and Wei (2017) found FDI is highly sensitive to the availability of external financing, and the financial crisis (including credit conditions in particular) has had a huge impact on FDI. Do and Rouse (2018) claimed that Global Financial Crisis implies that foreign capital flows influence financing and investment decisions of firms — particularly those of financially constrained firms (not only during, but also outside of the Global Financial Crisis period). Alfaroy and Chenz (2010) find out that in case of global crisis FDI plays a complex and comprehensive role in micro economic. This requires the identification of the channels through which the FDI influences business performance. Poulsen and Hufbauer (2013) compare between the FDI recession from the year 2007 with FDI responses to past economic crises. The main conclusion that the decline in outflows from developed countries did not differ significantly from the previous ones. However, there is a significant time difference in recovery in FDI, to the benefit of early recessions (Poulsen & Hufbauer, 2013). Research carried out in the Netherlands show that systemic risk rises when firms are engaged in FDI activity, which may mean that international networks and global

supply chains contribute to systemic risk propagation (Van Cauwenberge *et al.*, 2019). Kersan-Škabić (2019) study shows that varying intensity of FDI has a positive and significant impact on the global value chain (GVC) participation in the EU–28. In the EU–15, FDI intensity has a weakly positive impact in models 2 and 5, while FDI inward stock has a negative influence on GVC participation. Economou (2019), analyzing the economy of Greece, Italy, Portugal and Spain, finds that protection of property rights, government integrity, monetary freedom, and financial freedom all have a robustly positive effect on FDI.

Related literature to the FDI and development link in Croatia is reviewed below. Škuflić and Botrić (2009) start from the theory that FDI's play an important role in the Croatian economy, and that export orientation, level of education and domestic investment in the country are essential for attracting them. Klapić and Nuhanović (2011) present factors that influence the course of FDI, the market, the quality of human resources, the legal framework for economic activity, the development of the financial sector, macroeconomic stability, privatization of state capital. Analysis of Cho *et al.* (2017) showed that specifically, market access and natural resources are significant assets to induce MNCs to directly invest in Croatia. Simultaneously, subsidiaries abroad and high domestic innovation intensity were found to yield more technology transfer, which improved business results. Jakšić *et al.* (2019) examined the dynamics of Croatian regional exports. Since FDI is mainly service-oriented, therefore, the impact of FDI on exports is negative. The research of economies of the United States and Canada that include foreign investment income flows show that monetary policy shocks have a statistically and economically significant impact on both gross and net foreign investment income flows (Auer, 2019).

Research undertaken in the Investment Promotion Strategy in the Republic of Croatia shows that advancement of technology, information, education and training and other quality factors are generating growth, constantly changing the development direction and enhancing national competitiveness and boosting investment (Ministry of the economy, 2014).

Macroeconomic efficiency of Croatia

Croatia has attracted a high level of foreign direct investment and stands out as the country with relatively the largest amount of FDI share in the GDP, but investment sectoral orientation remains an issue. The activities that have attracted the most foreign direct investment are financial intermediation, chemical and chemical product manufacturing, telecommunica-

tions, trade and the oil industry. The expected effects of investment, an increase in exports and unemployment drop, depend on the initial conditions of the receiving country, its economic policy, its education on the workforce and the level of technological development. The structure of FDI by industry is presented in Fig. 1

From 1993 to 2017, the largest investments were made in financial intermediation (40%), followed by wholesale and retail trade mediation (12%), real estate operations (9%), post and telecommunications (8%), low (7%), coke, petroleum products and nuclear fuel (6%). Other activities include property investment, chemicals, hotels and restaurants. According to research by Franc-Dąbrowska *et al.* (2019), the scale of investment in the financial industry is not surprising, since the financialization process has been underway for half a century now, and investors prefer high, swift and risky profits generated in the financial sphere at the expense of investing in the real economy. This was the case in the economy of Croatia, where out of 149 Croatian enterprises surveyed, 53% paid dividends, and 47% left a profit for capital increase and / or investment.

With the accession of the Republic of Croatia to the European Union, there has been no change in the investor countries, with Austria still holding 24.5%, followed by the Netherlands with 26%, Austria 15%, Italy 13%, Germany with 11%, Luxembourg 9%. and Hungary 8% (Fig. 2). Also, as far as the tax system is concerned, there are two things that can be perceived as a significant investment advantage. The first advantage is the signing of a double taxation treaty with many states, and the second is the many tax incentives. Also, Croatia is part of the single customs territory of the European Union.

What counts as an advantage in investing in the Republic of Croatia is certainly the workforce. Croatia's workforce is efficient and highly skilled. What forms the Croatian workforce excellency is, of course, multilingualism. All the research shows that the primary advantage of the country is that diverse workers in all sectors have knowledge of at least one foreign language, if not more. Knowledgeable workforce is the main reason why 15,000 firms invested in Croatia, despite corruption and poor business conditions (doing business).

Employment in the Republic of Croatia has been declining since the 2008/2009 crisis. Although indicators show employment is increasing, production capacities are not fully utilized, with a large part of the workforce migrating to other EU countries. In Croatia, the actual unemployment rate in 2010 was 17.6%, while in 2013 it was 20.2% as a consequence of the crisis. From all the above, it can be observed that unemployment has been increasing year by year. Several important problems characterize the

Croatian labor market in terms of unemployment: long-term unemployment, unbalanced supply and demand for workers, low active population, and high unemployment. Nevertheless, statistics show an improving picture of the situation, and according to Statistica, the unemployment rate in Croatia was 7.77% in 2019 (for comparison, this source gives unemployment in 2010 at 11.62% and in 2013 at 17.25% (<https://www.statista.com>)).

Foreign direct investments in Croatia

In the Republic of Croatia, the first foreign investments were recorded in the 1990s, and due to the unfavorable investment structure, no positive effect on the economy of the Republic of Croatia was visible. The most significant inflow occurred during the privatization of Croatian Telekom in 1999. By 2001, the share of investments increased to the level of approx. 23% following investments in infrastructure, road construction and construction. By 2001, the share of investments is increasing to the level of approx. 23% due to investments in infrastructure, road construction and construction. In the period from 2001 to 2007, due to the change in fiscal consolidation, the share of public spending decreased from 22.9% of GDP (2001) to 20.1% of GDP (2007), and by 1996 investments amounted to 21.9% of GDP. By 2008, Croatia had recorded an average annual GDP growth of 4%, and a deficit in foreign trade balance, slower growth of foreign debt and price stability resulting from the new political reform. This points to a possible correlation between fiscal consolidation and FDI, GDP. In Croatia.

With the accession of the Republic of Croatia to the European Union, more capital inflows and investments of foreign countries into Croatia were expected than ever before. Such expectations are not fully met fulfilled, although accession to the European Union is certainly detected in terms of investment. The authorities in the Republic of Croatia must in any case be aware of the importance of directing efforts to attract FDI.

The war 1991–1995 in Croatia demotivated potential investors into investing. A high investment rate of over 30% of GDP on average was recorded in 2005–2007. Then came the global financial crisis, and since the last quarter of 2019, the crisis caused by the COVID-19 epidemic, which will undoubtedly affect the economy, although at this moment it is difficult to judge to what extent. However, the FDI inflow can be expected to decrease, and thus the inflow of funds in this respect as well as the long-term effects of implemented investments should be extended. It is already known that in December 2019, Croatia's FDI fell by USD 1.0 million, when in-

vestment in foreign portfolio fell by USD 1.5 billion, and the country's nominal GDP was reported at USD 14.7 billion (<https://www.ceicdata.com>).

Data collection and methodological framework

The FDI impacted period on GDP, employment and exports extends from 2002: 2 to 2017: 3. The variables GDP, exports and employment were taken from the Eurostat database, while the FDI variable was taken from the CNB database. For the export variable, we assume real exports (2010 = 100) of goods and services, seasonally and calendar adjusted, for the foreign direct investment indicator (FDI) of foreign direct investment from all countries, in millions of euros, for the employment indicator total employed in thousands from 20 to 64, seasonally adjusted, and for GDP indicator real GDP (2010 = 100), seasonally adjusted. Real GDP is a better indicator for us, as prices fluctuate over a period, thus eliminating the impact of price movements from nominal GDP (by deflating¹ nominal GDP). All variables were previously interpolated. We modeled the period by one dummy recession variable from 2009: 1 to 2014: 1 We collected the logarithm, seasonally adjusted by Gretl software package (ARIMA X12), since we want to show the constant elasticity expressed in relative changes (%).

We test for a deterministic trend or stochastic using the Extended Dickey-Fuller (ADF) test (Fuller, 1996), (Auer, 2019). ADF (augmented Dickey-Fuller) test tests on specification:

$$\Delta y = \alpha + \beta t + \gamma z_{t-1} + \sum_{i=1}^p \delta \Delta z_{t-i} + e_t \quad (1)$$

is the coefficient $\gamma = 0$, as opposed to the hypothesis that $\gamma < 0$ (since we do not consider explosive processes). In other words, the ADF test tests whether it is a random drift process versus a trend stationary process. For $\gamma = 0$, this trial tests a process with a unit eigenvalue ($\gamma = 0$) versus a stationary series ($\gamma < 0$). We will use the critical values of the ADF test they presented in their 1981 Dickey and Fuller article (Dickey & Fuller 1981). The ADF statistic used in the test is a negative number and, the more negative, the stronger the rejection of the hypothesis that there is a unit root at some level of reliability. Before starting ADF testing, data must be reviewed to evaluate a suitable regression model. To select the lag lengths of autoregressive members, we will follow the SBIC (Schwartz Bayesian Infor-

¹ Compare e.g Auer (2019).

mation Criterion) criterion by minimizing statistics: $SBIC = T \ln(\Sigma e^2) + n \ln(T)$, where T is the sample size, the sum of the squares of the residuals refers to the sum of the squares of the residuals of the regression of the variable to the constant and auto-regressive members or to the constant, trend and auto-regressive members, n is the regression of the estimated number of parameters (Belullo, 2009, 2011).

The basic VAR model may be too limited to effectively represent the main features of the data. The length of the lag can be determined using a selection criterion model, a value p is selected that minimizes one of the criterion models. The goal is to minimize statistics to obtain optimal time lags through the Akaike Information Criterion (AIC), Schwartz or Schwartz-Bayes Criteria (SC, SBC) and Hannan-Quinn (HQC) criteria. Numbers of shifts we test using SC and HQC criteria. The SC criterion (Schwartz, 1978) equals $SC(m) = \ln|\sum_u(m)| + \frac{\ln T}{T} mK^2$, under minimization conditions. When it comes to cointegration, two-time series are presumed to be non-stationary, but their linear combination is stationary and is denoted $I(d)$. By differentiating that string many times, we will station the array. Tests can determine cointegration like the Engle-Granger test, Johansen method (1988, 1991) through VECM (vector error correction model) and other methods depending on the desire of the researcher.

A variable influences Granger in the sense of another variable when some of its past realizations affect the present realization of another variable. The condition for conducting the test is the stationarity of the variables. In case they are not stationary variables, the values of the variable are differentiated. Testing the cointegration of variables, the Engle-Granger cointegration test is performed by determining the integration of variables using the ADF test, and the next step is to test the stationarity of the residuals. If they are the residuals that are stationary, then the variables are cointegrated, and the EC model will be used in further analysis. In the case of their non-stationarity, the variables are not cointegrated and the model is used in the short term:

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_t + u_t \quad (2)$$

The term error correction refers to the fact that the deviation from the long-run equilibrium, the error, affects its short-term dynamics. In the case of cointegrated variables, the EC model is used. Thus, the ECM directly estimates the rate at which the dependent variable returns to equilibrium after a change in other variables. In case the variables are non-stationary and not cointegrated, the model with differentiated variables is estimated

because they provide information about the short-term correlation of the variables. Variables are cointegrated if they share a common trend.

Results

Fig. 3 present line graphs of FDI, GDP, exports and employment in the Republic of Croatia in the period 2002–2017. Line graphs show time series data in logarithm form. From the graph, we can see that the variables of GDP, exports and employment exhibit trend behavior. We can test such processes for stationarity using the Dickey Fuller test. If we can reject the hypothesis with 5% significance or 95% confidence, it means the trend is deterministically significant and that the trend stems from a constant member and unit root of the process itself.

We got the GDP deflator by dividing nominal GDP by real GDP. During the recession, the inflation rate was the highest, higher than the EU28 average that year. The reason for this situation was the rise in consumer prices of energy, food and intermediate products also from the 2007 inflation transfer, and the level of employees decreased. In the same period of 2008, transfers to citizens on the basis of debt payments to pensioners were reduced. Banks slowed growth in household loans due to weaker demand as interest rates rose and due to uncertainty of the population about future cyclical developments in the economy. It was not until 2013 that inflation slowed down. Regarding FDI inflows in the crisis period, it was lower precisely for the present inflation, since lower returns for investors can be expected as the money loses to its true value, which is certainly not a favorable situation for the investor.

In terms of the real effective exchange rate during the recessionary period, it appreciated, and the economy was focused on increasing imports of cheap goods, causing deterioration in the balance of payments, which resulted in a deficit. Foreign capital is directed at financing domestic demand, and most FDIs were brownfield in privatizations (INA, HT, TDR, PLIVA, EUROPETROL), to existing companies, while only a minor part of FDI was directed to the manufacturing industry (Fig. 6). Kokores *et al.* (2017) analyzed the flow of FDI during recession and deflation. They found deflation does not deter FDI flows from core to periphery Eurozone countries.

We have stationed time series in the first difference, which we can identify because they converge to 0. Since stationarity is an assumption on the statistical procedures used in the analysis of time series or series, non-stationary data are often transformed to become stationary and to be valid for further analysis. Whether the processes are stationary or not can be de-

duced on the basis of a trend, which may be due to a unit root or a deterministic trend. In the first case of unit root, stochastic shocks have a permanent effect and the process does not change. In the case of a deterministic trend, the process is called a stationary process trend, and stochastic shocks have only a transient effect. The trend stationary process is not strictly stationary and can easily be transformed into a stationary process by removing the trend. Processes with one or more root units can be stationered through differentiation. The ADF statistics that used in the test is a negative number, the more negative, the stronger the rejection of the hypothesis that there is a unit root at some level of reliability — for example Hsieh *et al.* (2019).

VAR LAG selection

After stationing the differentiated series, it is necessary to determine the time shifts before constructing the VECM model itself to obtain the optimal number of shifts that will be of major importance to us for further analysis. The length of the lag can be determined using a selection criterion model, a value p is selected that minimizes one of the criterion models. The goal is to minimize statistics to obtain optimal time offsets through the Akaike Information Criterion (AIC), Schwartz or Schwartz-Bayes Criteria (SC, SBC) and Hannan-Quinn (HQIC) criteria. Amounts of time shifts on which its dynamics depend will be tested by the HQ criterion.

Johansen cointegration test

The Johansen test seeks to examine whether there are cointegration relations between variables from the rank of the matrix Π . Following the Johansen procedure (determining the rank of the matrix Π using the eigenvalues of the matrix. Since Π is a square matrix of order n , it follows that the number of eigenvalues equals n (Bahovec *et al.*, 2009). The model is interpreted by means of a test track of the eigenvalue matrix (λ trace test) and the highest eigenvalue test (λ max test).

According to Johansen's procedure the test is performed sequentially. The first pair of hypotheses of λ trace test is as follows:

$H_0 - r(\Pi)=0$, no cointegration vector exists;

$H_1 - r(\Pi)=0$, there is at least one cointegrating vector.

If there are no basis for rejecting the null hypothesis, it is concluded according to the H_0 hypothesis and the test procedure is terminated. On the other hand, if the null hypothesis is rejected, the next sequence is passed and the next pair of hypotheses is assumed according to the following pattern

$H_0 - r(\boldsymbol{\Pi})=1$, there is one cointegration vector;

$H_1 - r(\boldsymbol{\Pi})=0$, there are at least two linearly independent cointegrating vectors.

In accordance with the obtained results, the null hypothesis of no cointegration should be rejected at the 5% significance level. In the second step of Johansen's procedure, there was no reason to reject the null hypothesis, which means that there is one cointegrating vector. Therefore one long-term cointegration relationship between the variables was stated.

VECM model

After deciding numbers of cointegration vectors, we normalize by variable (FDI variable). By comparing the two VECM models, we decide on a more representative VECM model.

The regression coefficients are calculated from the maximum likelihood method. From the data presented, we conclude the equation defines the cointegration vector:

$$\widehat{LFDI}_t - 5.405 * LZAP_t + 11.248 * IIZV_t - 11.496 * lBDP_t + 0,596 * rec = 0, \quad (3)$$

$$\widehat{lFDI}_t = 5.401 * LZAP_t - 11.248 * IIZV_t + 11.496 * lBDP_t - 0.596 * rec$$

The long-run equilibrium cointegration equation with the error correction factor is:

$$ECT_t = lFDI_t - 5.401 * LZAP_t + 11.248 * IIZV_t - 11.496 * lBDP_t + 0.596 * rec \quad (4)$$

The parameters of the matrix α with the independent variables — employment, exports and GDP are not statistically significant on the basis of t values ($t < 2$) and p values ($p > 0.05$), and we can conclude variables do not adjust for the long-term relationship. We conclude the variables of em-

ployment, exports and GDP were exogenous in the short term. However, the FDI variable adjusts to the long-run equilibrium and is statistically significant (see Kersan-Škabić, 2019).

Discussion

Stability of the model

Verification of the formal correctness of the model takes place in several stages. By analyzing the residuals of the estimated model, we can conclude that we have no problems with autocorrelation (p value is not statistically significant), since we cannot reject the hypothesis with 5% significance.

The ARCH test results also suggest that heteroskedasticity is not present in the model. We cannot reject the hypothesis with 5% significance, which allows us to conclude about homoskedasticity in variance of random error. Considering the statistical tests carried out, the model was found to be formally correct.

Cholesky decomposition of variance-covariance matrix

Below, we have applied Cheloski's decomposition of a variance-covariance matrix, which requires the proper selection of variables since it wants to show instant causality, and we put the FDI variable first. The results obtained show the importance of independent variables of GDP, exports and employment in explaining FDI over time.

The results show (not presented here) that most of the variation in FDI was explained by a 49% change in exports in the 31st quarter, while a change in GDP was explained by a diversity of up to 1.65% and a change in employment of up to 12%. Most of the variations in employment are explained by a change in FDI of only 9%, while changes in exports and GDP do not explain employment. Some variations in exports were explained by a change in FDI of only 1.3% and a GDP of 26.8%. Part of the variation in GDP is not explained by changes in FDI, employment and exports. From the obtained values, it can be concluded that there is a weak feedback from the impulse response functions of the observed variables, and the effect of the variables in the Croatian economy is weak.

Analysis impulse responses

The last stage of research was the analysis of the response to unit orthogonal impulses (Fig. 7). From the analysis of the response to unit orthogonal impulses, it can be seen that all the variables return to their initial equilibrium. The FDI variable does not affect GDP, employment and exports statistically significantly. The weak influence of the variables indicates that some other factors are important for the FDI inflow in the long run. More than 70% of FDI relates to activities that are not export-oriented and have no significant export links. In view of this, such foreign investment in the Republic of Croatia may not result in spillover effects in industry. Therefore, one can relate this outcome to insufficient competitiveness of the economy at the global and international level. Then there is also insufficient employment growth and export growth, as already stated.

For the robustness purpose, we use a vector auto-regression model on log differenced data to achieve VAR stability. Running a stationary VAR model gives us similar results with minor differences in the estimated long-run parameters. Also, using unemployment variables instead of employment does not alter the results of our study supporting the model, results, validity and robustness. Estimated stationary VAR model and VECM model with unemployment variable are not presented here due to the publication space constraints.

Our study results are in line with the findings by Derado (2013). FDI is important for growth in Croatia, but other factors (market size, competitive production, corporate taxes, exchange rate and productivity) are limiting the FDI potential impact. Our results also support the findings by Dritsaki and Stiakakis (2014), showing the export key role in economic growth and FDI having merely a supportive role. Particularly, our results are following the ones in Sohinger and Harrison (2004) pointing to the sectoral structure of FDI importance for growth in Croatia.

Conclusions

Given the fact that foreign direct investment in the country brings capital, assets, modern technology and many other positive effects the economic situation in the country should be getting better. This is not so evident in Croatia. Most investments are not greenfield investments, and the funds coming from the investment serve for debt repayment mostly. An important feature of the Croatian economy is technological lagging with pure macro-economic management (mismatch between fiscal and monetary policy). In

the country, a restrictive monetary policy leads to an increase in interest rates, which is certainly not attractive to investors, thus reducing investment, leading to a decrease in employment, exports and GDP. Fiscal policy restriction refers to the position of the government, like fiscal and monetary policy mismatches, poor budget planning, the problem of public spending amounts and structure, and the problem of deficit financing. This paper shows there is a long-run relationship between FDI and macroeconomic aggregates in Croatia. However, the impact is minor and not significant due to its poor FDI structure, corruption and low overall competitiveness of the economy. The study results are not only important for researchers but, concerning the determinant, scale and direction of FDI, also for policymakers.

From the perspective of long-term policy implications and theoretical contribution of the current research, which directly corresponds to knowledge gap pointed in the introduction, we provide empirical evidence that FDI is a necessary, but not sufficient condition for quick growth convergence with the most developed countries. The FDI structure retains the key role in growth. To sum up, this outcome is of special importance for small and opened economies that face the challenge of reducing their development gap.

However, there are also limitations of the research that must be pointed out. The time series data availability limits our study and other possible indicators that could be applied in the modeling procedure. Therefore, exploring other micro-economic determinants of FDI could improve the empirical results of the study. Future studies on long-run FDI effects on the economy using time series econometric methods should use a variable displaying the FDI structure for modeling purposes. Depending on the share of brownfield investments in the total FDI inflow, long-run coefficient estimates change significantly reducing the modeling bias risk.

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Annex

Figure 1. FDI by activity 1993–2017 (%)

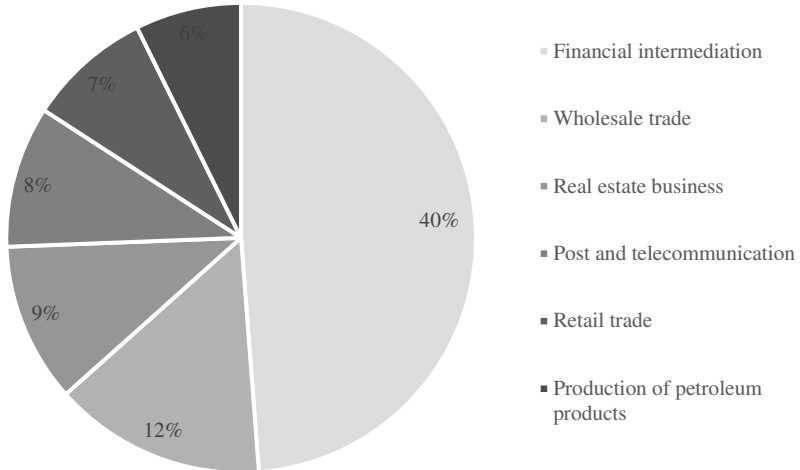


Figure 2. Total FDI by country of investors in the period 1993–2017 (%)

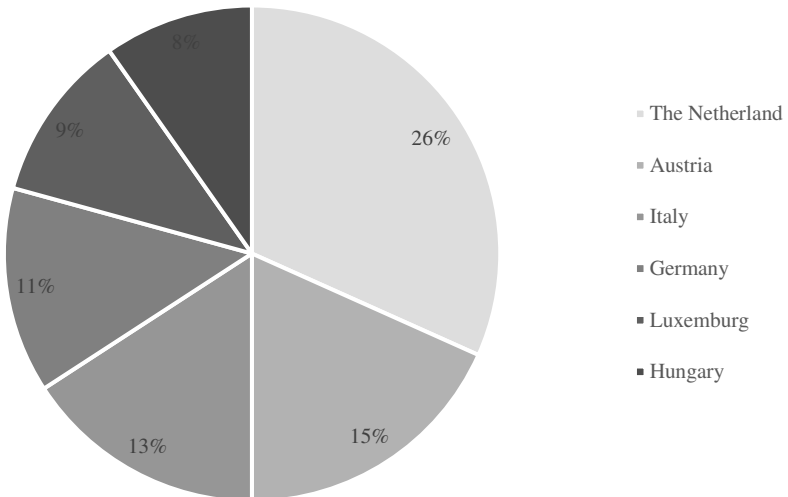


Figure 3. Line graphs of FDI, GDP, exports and employment in the Republic of Croatia in the period 2002–2017 (quarterly data)

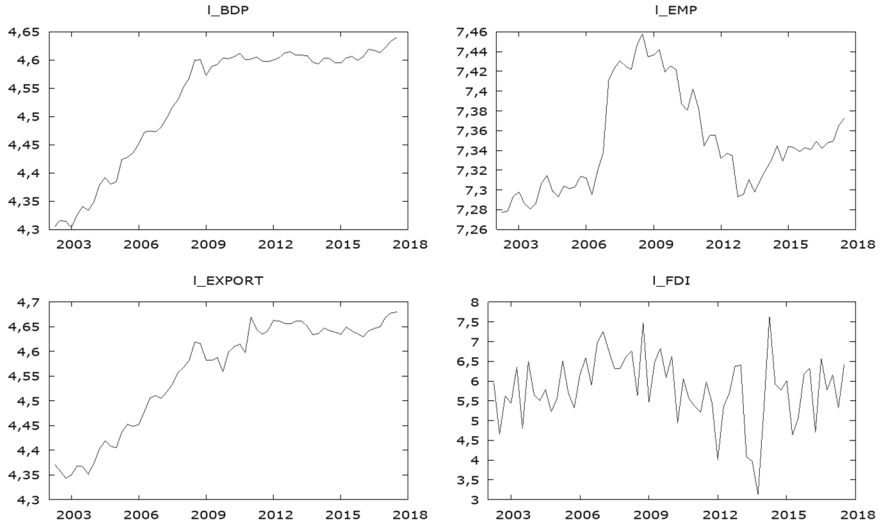


Figure 4. GDP deflator and Harmonised consumer price index

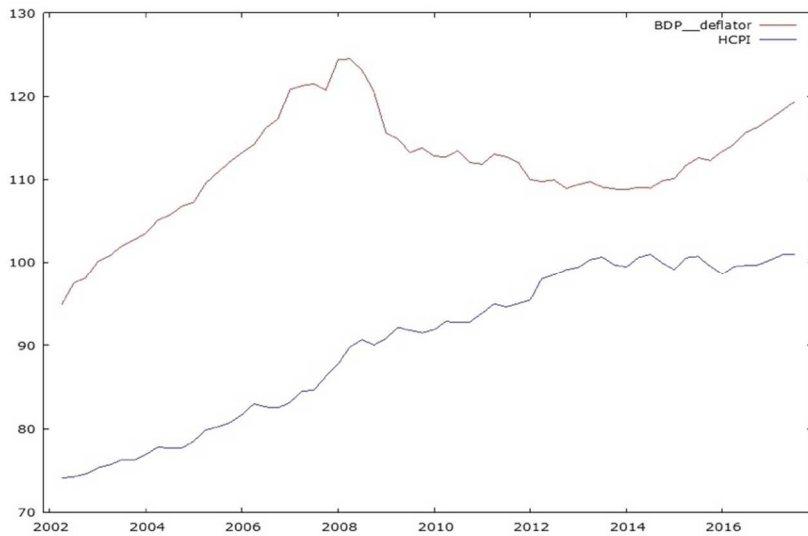


Figure 5. Real effective exchange rate KN/EUR



Figure 6. Stationary variables by first difference in the Republic of Croatia in the period 2002–2017

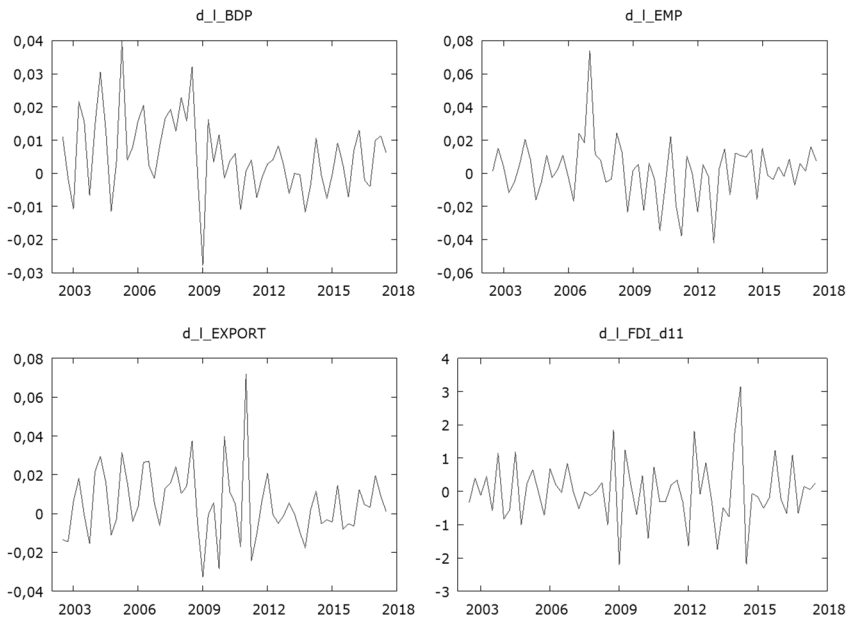


Figure 7. The unit orthogonal impulse

